TECHNICAL MANUAL

OPERATION AND MAINTENANCE INSTRUCTIONS

ORGANIZATIONAL AND INTERMEDIATE

TELETYPEWRITER SET
AN/UGC-129(V)1
PART NUMBER 141900-0001
141900-0003

This manual supersedes 31W4-2UGC129-31; Dated 1 May 1986

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF THE AIR FORCE

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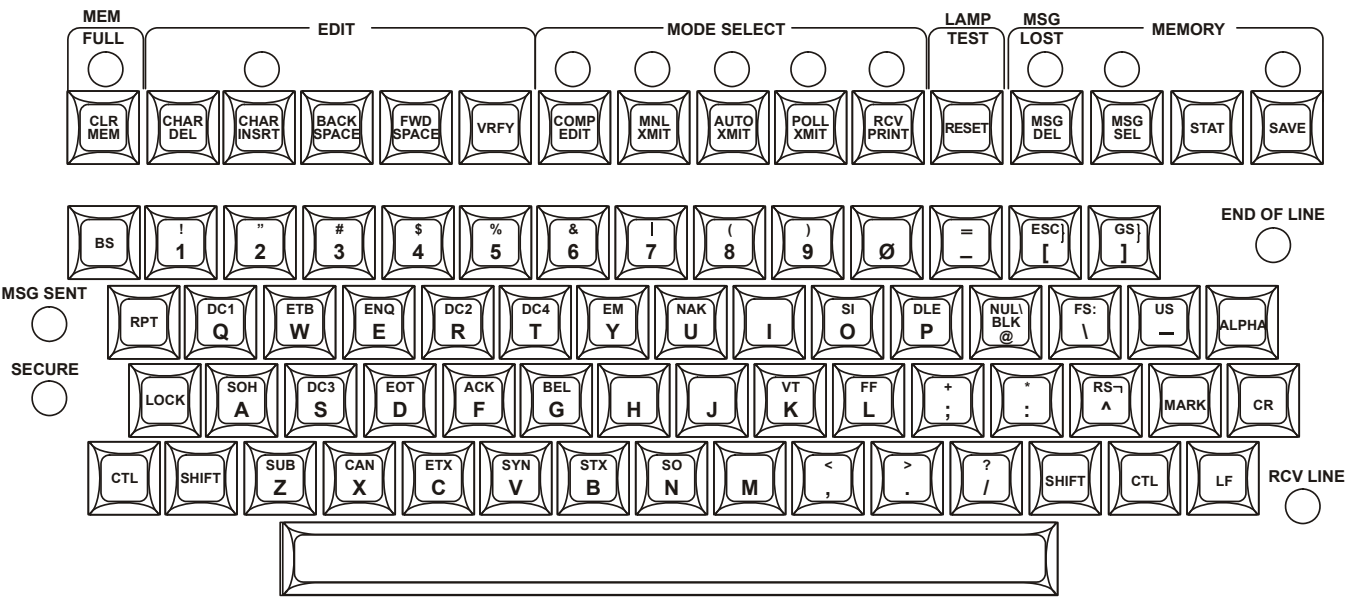
NOTE: KEYS F AND J HAVE TINY BUMPS TO INDICATE OPERATOR HOME POSITION.

COLOR	KEYS/CONTROLS	LAMPS
WHITE		MSG SENT AND RCV LINE
YELLOW	CTL, CLR, MEM AND MSG DEL CONTROLS. (AND MARK KEY LETTERING)	SECURE, MEM FULL, MSG LOST AND END OF LINE
GREEN	RESET CONTROL	CHAR INSRT, COMP EDIT, MNL XMIT, AUTO XMIT, POLL XMIT, RCV PRINT, MSG SEL, AND RCVR SAVE
GRAY	ALL CHARACTER, BS, RPT, LOCK, SHIFT, MARK, ALPHA, CR, AND LF KEYS	
BLACK	CHAR DEL, CHAR INSRT, BACK SPACE, FWD SPACE, VRFY, COMP EDIT, MNL XMIT, AUTO XMIT, POLL XMIT, RCV PRINT, MSG SEL, STAT, AND RCVR SAVE CONTROLS	

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Figure 4-4. Keyboard Assembly Character/Control Keys and Indicators

Table 4-3. Keyboard Assembly Mode Controls

Designation	Function
COMP EDIT	Selects mode used to compose and store messages into text memory from the keyboard assembly or to verify and edit messages stored in memory. **CHAR DEL**, **CHAR INSRT**, **BACK SPACE**, **FWD SPACE**, and **VRFY** controls can only be active when COMP/EDIT mode is selected. If message has been selected, the first 40 characters of the message are displayed with the cursor positioned at the first character. If a message has not been selected, each compose character is displayed as it is keyed in and entered into memory. The cursor position (memory pointer) is indicated by a blinking light
VRFY	Used in COMP/EDIT mode to obtain printed hard copy of the contents of the selected message for verification. Printing can be interrupted and restarted by depressing the VRFY key as desired.
CHAR DEL	Used in COMP/EDIT mode to delete characters from stored text. Initially, **BACK SPACE** and **FWD SPACE** keys are used to move the display cursor to the character to be deleted. **CHAR DEL** key is then depressed to delete the character. All characters to the right of deleted character shift to the left one position. Adjacent characters in the forward direction can be deleted by depressing the **CHAR DEL** key.
CHAR INSRT	Used in COMP/EDIT mode to insert additional characters in stored text. Initially, the **BACK SPACE** and **FWD SPACE** keys are used to move display cursor to exact location where characters are to be inserted. **CHAR INSRT** key is then depressed to allow insertion of characters by depressing applicable character keys. A lamp located above **CHAR INSRT** key is turned on while this mode is active. The cursor position and every character to the right are shifted one position to the right for each character inserted. Exit from this mode is made by depressing **CHAR INSRT** key again.
BACK SPACE	Used in COMP/EDIT mode to move the display cursor backward one character at a time during editing. When **CTL** key is held depressed while **BACK SPACE** key is depressed, the display cursor is moved back to the first character of the display line. If already there, the preceding 40 characters of text are displayed and the cursor is moved to the first character of that line.
FWD SPACE	Used in COMP/EDIT mode to move display cursor forward one character at a time during editing. **FWD** function is auto-repeating if key held is depressed. If the CTL key is held depressed, the next 40 characters of text are displayed and the cursor is positioned over the first character of the new display. By holding **CTL** and **FWD SPACE** keys depressed, the display can be made to scroll forward through the text
MNL XMIT	Selects mode used to transmit text directly from the keyboard assembly. Each character is printed as it is transmitted.
AUTO XMIT	Selects mode used to automatically transmit a message stored in text memory. This key can also be used to generate an RY series test message pattern. To transmit the RY pattern, depress **COMP EDIT**, then depress **CTL** and hold while depressing **AUTO XMIT**. RY pattern is transmitted if teletypewriter set is connected into communication system. RY pattern cannot be generated when internal control panel BAUD RATE switch is in SYN position without external clock pulses. Also, RY pattern can be transmitted, but not printed, when BAUD RATE switch is set to 2400. See also AFSATCOM AUTO XMIT at end of this table.
RCV PRINT	Selects mode used to disable printing for all modes of operation except printing receive messages or for verification of stored messages.
RESET	Used to disable any previously selected modes except for RCVR SAVE mode. Illuminates all keyboard lamps and the character display, while held depressed for lamp test. Activation of **RESET** control does not affect the contents of memory.

Table 4-3. Keyboard Assembly Mode Controls - Continued

Designation	Function
CLR MEM	Used to erase entire contents of text memory when depressed in conjunction with **CTL** key. **CTL** key must be depressed and held prior to depressing the **CLR MEM** key.
MSG DEL	Used to erase the selected message from memory. **MSG DEL** must be depressed after **CTL** is depressed and held.
MSG SEL	Used to assign numbers to contents of memory or to select messages for transmission, verification, or editing. After **MSG SEL** is depressed, key in any two digits in the range of 01 through 64. If the number selected is in memory, that message will be transferred to comp/edit memory; if not, the number selected must be used to create a new message. Printing line length is changed from 80 characters by first depressing **MSG SEL** and entering digits 00, followed by a 6 (69 characters) or 7X (where X=0 through 9). An 8 changes line length back to 80 characters per line. 80-character line length is automatic at power up. See also AFSATCOM at end of table.
STAT	Used to review memory status. When depressed, the printer responds with a list of message numbers assigned, message segment locations, message origin, and remaining number of segments available.
RVCR SAVE	Used to route incoming messages to memory. Message numbers are automatically assigned in this mode. This mode is entered automatically at power up.
AFSATCOM ONLY	
POLL XMIT	Selects mode used to automatically transmit a message stored in text memory in response to a poll inquiry.
MSG SEL	AFSATCOM message length requirement is met by depressing **MSG SEL** key, then depressing **CTL** key and holding while message length digits (20 to 160) are entered. Message length entry may range from 20 to 160 characters in increments of 20 characters.
AUTO XMIT	RY pattern test message generation is possible in AFSATCOM operation only if the teletypewriter set is connected into operational AFSATCOM system because of external clock requirement. RY patterns cannot be generated when internal control panel BAUD RATE switch is in SYN position without external clock pulses.

Table 4-4. Keyboard Assembly Text Characters/Controls

Symbol		Name
!	(SHIFT)	Exclamation Point
"	(SHIFT)	Quotation Mark
#	(SHIFT)	Number Sign
$	(SHIFT)	Dollar Sign
5	(CTL)	(NOTE 1)
%	(SHIFT)	Percent
6	(CTL)	Manual Assignment Control (AUTODIN only)
&	(SHIFT)	Ampersand
7	(CTL)	(NOTE 2)

Table 4-4. Keyboard Assembly Text Characters/Controls - Continued

Symbol		Name
'	(SHIFT)	Apostrophe
(	(SHIFT)	Opening Parenthesis
9	(CTL)	(NOTE 3)
)	(SHIFT)	Closing Parenthesis
=	(SHIFT)	Equals
_		Underline
-	(SHIFT)	(NOTE 4)
A	(CTL)	Transmit all messages on selected MTUT tape
B		Blank (erase) entire tape
D		Print all messages on selected MTUT tapes
E		Erase tape from present position to end
F		Write Tape File Mark
L		Position tape at load point
R		Select receive MTUT
R		Read a tape record
R	(CTL)	Write received messages on tape
S		Search for a tape record
T		Select transmit MTUT
T		Print tape status
T	(CTL)	Transmit a tape record
W		Write a message on tape
{	(SHIFT)	Opening Brace
}	(SHIFT)	Closing Brace
[		Opening Bracket
]		Closing Bracket
@		Commercial At
\		Reverse Slant
-		Hyphen
+	(SHIFT)	Plus
;		Semi colon
*	(SHIFT)	Asterisk
:		colon
		Circumflex

Table 4-4. Keyboard Assembly Text Characters/Controls - Continued

Symbol		Name
<	(SHIFT)	Less Than
>	(SHIFT)	Greater Than
?	(SHIFT)	Question Mark
,		Comma
.		Period
/		Slant
ACK	(CTL)	Acknowledge
ALPHA		Alphabet Upper Case
BEL	(CTL)	Bell
BLK	(SHIFT)	Grave Accent
BS		Backspace
CAN	(CTL)	Cancel
CR		Carriage Return
CTL		Control
DC1	(CTL)	Device Control 1
DC2	(CTL)	Device Control 2
DC3	(CTL)	Device Control 3
DC4	(CTL)	Device Control 4
DLE	(CTL)	Data Link Escape
EM	(CTL)	End of Medium
ENQ	(CTL)	Inquiry
EOT	(CTL)	End of Transmission
ESC	(CTL)	Escape (NOTE 5)
ETB	(CTL)	End Transmission Block
ETX	(CTL)	End of Text
FF	(CTL)	Form Feed
FS	(CTL)	File Separator
GS	(CTL)	Group Separator
HT	(CTL)	Horizontal Tabulation
LF		Line Feed
LOCK		Lock Shift
MARK	(CTL)	Special Transmit Mode (AFSATCOM only)
NAK	(CTL)	Negative Acknowledge

Table 4-4. Keyboard Assembly Text Characters/Controls - Continued

Symbol		Name
NUL	(CTL)	Null (NOTE 6)
RPT		Repeat
RS	(CTL)	Record Separator
SHIFT		Shift (Lower/Upper Case)
SI	(CTL)	Shift In (NOTE 7)
SO	(CTL)	Shift Out (NOTE 8)
SOH	(CTL)	Start of Header
STX	(CTL)	Start of Text
SUB	(CTL)	Substitute
SYN	(CTL)	Synchronous Idle
TLD	(Shift)	Tide
US	(CTL)	Unit Separator
VT	(CTL)	Vertical Tabulation

NOTES:

1. Used to enter tape mode of operation.

2. Used to enter phonetic mode of operation during COMP/EDIT mode only.

3. Used to exit phonetic mode of operation during COMP/EDIT mode only.

4. Transmits DELETE character (all mark) during ASCII operation only.

5. While in tape mode (CTL-5 selection), this function is used to exit AUTO-TRANSMIT and AUTO-RECEIVE functions. Also, used to reset other tape functions, including exiting the tape mode. (See Section V, Procedures Unique to MTUT Mode.)

6. Transmits BLANK character (all space) in BAUDOT mode only.

7. Transmits LETTERS character (all mark) in BAUDOT mode only.

8. Transmits FIGURES character (1, 2, 3, 4, 5, mark) in BAUDOT mode only.

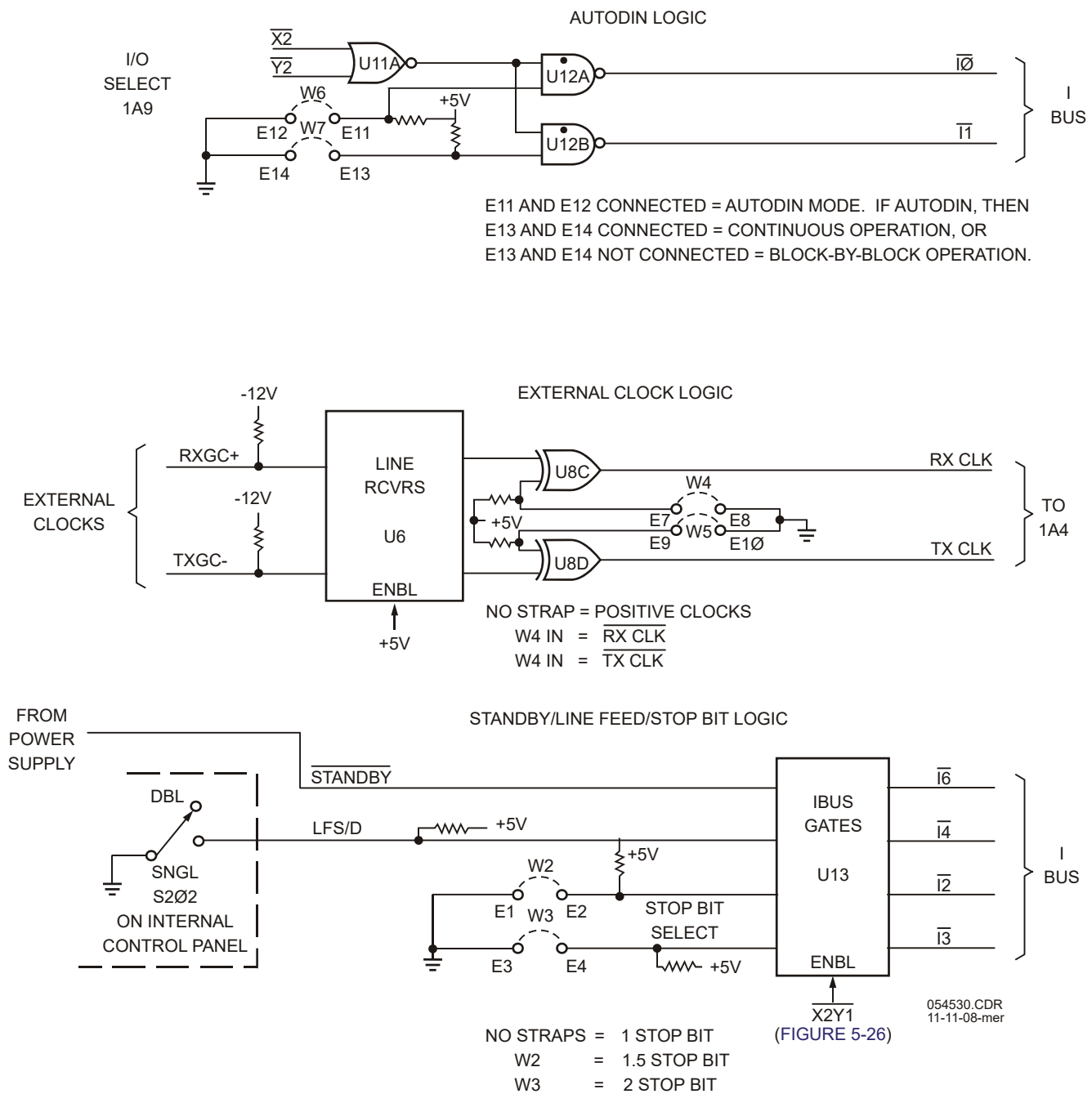## 5.22 PCB 1A3 MISCELLANEOUS CONTROL LOGIC.
(Figure 5-28, Figure 5-30)

E11 AND E12 CONNECTED = AUTODIN MODE. IF AUTODIN, THEN
E13 AND E14 CONNECTED = CONTINUOUS OPERATION, OR
E13 AND E14 NOT CONNECTED = BLOCK-BY-BLOCK OPERATION.

NO STRAP = POSITIVE CLOCKS
W4 IN = $\overline{\text{RX CLK}}$
W4 IN = $\overline{\text{TX CLK}}$

NO STRAPS = 1 STOP BIT
W2   = 1.5 STOP BIT
W3   = 2 STOP BIT

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(FIGURE 5-26)

Figure 5-30. PCB 1A3 Miscellaneous Control Logic - Simplified Diagram

5.22.1 <u>Status Indicator Logic</u>. (Figure 5-28) Status indicator register U5 is loaded with updated status data from the AC bus when addressed with the X2Y0 address. Bits AC2-AC4 are active low lamp bits and bit AC6 is the active high alarm bit (bit AC1 = MOVE is not used in high speed TTY). The indicator bits, along with the SECURE bit, are inverted by inverter U3. The now active high lamp bits are conditioned by pullup resistors R47-R50 and applied to lamp drivers U19. The active bits turn on the respective lamp driver to complete the keyboard lamp circuit via current limiters R51-R53. This action causes the applicable POLL XMIT, MSG SENT or SECURE lamp to energize. SECURE 1 amp can also be turned on via the AFSATCOM lines. The active low AUDIO signal out of inverter U3, completes the audio alarm curcuit if the front panel AUDIO switch S101 is in the ON position.

5.22.2 <u>AUTODIN Inquiry Logic</u>. (Figure 5-30) This logic consists of gates U11A, U12A/B, terminals E11-14, straps W6, W7, and two pullup resistors. At powerup, the CPU issues address X2Y2 to place a high at one input of gates U12A/B. If W6 is not installed, gate U12A drives the $\overline{I0}$ line of the I bus low, indicating to the CPU that the TTY is not in AUTODIN mode. If strap W6 is installed, gate U12A drives the $\overline{I0}$ line high to indicate AUTODIN mode. If in AUTODIN mode, then the CPU monitors $\overline{I1}$ with address X2Y2 to determine if block-by-block (W7 out) or continuous (W7 in) AUTODIN format.

NOTE

> The external clock logic is active during standard AUTODIN, or KG-30, submode operation.

5.22.3 <u>External Clock Logic</u>. (Figure 5-30) This logic converts the external RX GC + and TXGC + clock from differential ± 6V levels to TTL levels with line receivers U6 and allows positive or negative clock selection at XOR gates U8C/D. If straps W4 and W5 are installed across terminals E7, E8, E9, and E10, respectively, then a high input at gates U8C/D generates a low output (negative clocks). If straps W4 and W5 are not installed, then a high input at gates U8C/D generates a high output (positive clocks).

5.22.4 <u>Standby/Line Feed/Stop Bit Logic</u>. (Figure 5-30) These signals are gated into the I bus by address $\overline{X2Y1}$. An active STANDBY signal on bit I6 indicates that the system primary power has been lost and is on +28V standby power. The line feed input from the double (DBL) and single (SNGL) front panel switch S202 indicates to the CPU on bit $\overline{I4}$ whether to single space or double space the printer text. The message stop bit format input to the CPU on bits $\overline{I2}$ and $\overline{I3}$ can be changed from 1 stop bit (no straps), to either 1.5 stop bits (W2 installed between terminals E1 and E2), or 2 stop bits (W3 installed between terminals E3 and E4).

5.23 <u>EXTERNAL I/O PCB 1A4 CIRCUITS.</u>

A general block diagram of the PCB 1A4 circuits is shown in Figure 5-31. These circuits consist of the message TX/RX data logic, and the control multiplexer (MUX) logic, used to provide the CPU with operation mode status. The MUX logic is addressed by the CPU with the XY lines to monitor the status of a specific operation control line from either a control switch or an active external input. The results are monitored on the I bus. The TX/RX data logic converts incoming RX data from serial data to parallel 8-bit words, and converts outgoing TX data from parallel-to-serial data bits. The TX/RX logic can process data in asynchronous (async), async with TD STEP, and synchronous (sync) modes. In async mode, no external clocks are required. Clocks are internally provided in PCB 1A4 with clock rate determined by baud rate select data from the CPU. The CPU selects this data from memory, after monitoring the BAUD RATE switch setting at the MUX logic. Async TD STEP mode, requires that the front panel EXT TDS switch be set to ENBL. This setting is monitored at the MUX logic by the CPU. During a TD STEP transmit cycle with TD STEP switch in ENBL position, the CPU monitors the MUX logic for a TD STEP pulse from the external equipment. The TD STEP clock logic is also monitored by the CPU so that a TX data, bit can be loaded into the TD STEP TX data logic, coincident with the clock following sensing of the TD STEP pulse. This procedure must be performed for every TD STEP TX data bit. In sync mode (AUTODIN or KG-30), external TX/RX clocks must be provided to PCB 1A4. A clock gate at the TX/RX clock input to the TX/RX data logic, allows the CPU to select external RX/TX clocks during synch modes. A detailed description of PCB 1A4 logic follows.